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EXAMINER
NEGIN, RUSSELL SCOTT

ART UNIT	PAPER NUMBER
1631	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/655,540	Applicant(s) CARTER ET AL.	
	Examiner Russell S. Negin	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26,30,31 and 34-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26,30,31 and 34-38 is/are rejected.
- 7) ☒ Claim(s) 1-26,30,31 and 34-38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/20/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Comments

It is acknowledged that claims 27-29 and 32-33 are cancelled.

It is acknowledged that claims 34-38 are added.

Claims 1-26, 30-31, and 34-38 are examined in this Office action.

Specification

The amendment filed 20 December 2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The incorporation by reference of Application No. 60408232, filed September 6, 2002 and Application No. 60452933, filed March 10, 2003 into the instant specification must have been made at the time of filing of the instant application.

According to section 608.01(p) of the MPEP:

The inclusion of such an incorporation by reference statement in the later-filed application will permit applicant to include subject matter from the prior application into the later-filed application without the subject matter being considered as new matter. For the incorporation by reference to be effective as a proper safeguard, the incorporation by reference statement must be filed at the time of filing of the later-filed application. An incorporation by reference statement added after an application's filing date is not effective because no new matter can be added to an application after its filing date (see 35 U.S.C. 132(a)).

Applicant is required to cancel the new matter in the reply to this Office Action.

Priority

The claim of benefit to Application No. 60408232, filed September 6, 2002 and Application No. 60452933, filed March 10, 2003 is granted.

Claim Objections

Claims 1-26, 30-31, and 34-38 are objected to because of the following informalities:

The claims are objected to because they include reference characters which are not enclosed within parentheses.

MPEP § 608.01(m) states:

Each claim begins with a capital letter and ends with a period. Periods may not be used elsewhere in the claims except for abbreviations. See *Fressola v. Manbeck*, 36 USPQ2d 1211 (D.D.C. 1995). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation, 37 CFR 1.75(i).

Specifically, claims 1, 6, 15, 17, 19, 21, 23, 25, and 30-31 contain method steps with reference characters not enclosed within parentheses.

In claim 1, the reference characters for steps a through f are followed by periods instead of parentheses.

In claim 6, the reference characters for steps a through e are followed by periods instead of parentheses.

In claim 15, the reference characters for steps a through c are followed by periods instead of parentheses.

In claim 17, the reference characters for steps d through f are followed by periods instead of parentheses.

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In claim 19, the reference characters for steps a through c are followed by periods instead of parentheses.

In claim 21, the reference characters for steps d through f are followed by periods instead of parentheses.

In claim 23, the reference characters for steps a and b are followed by periods instead of parentheses.

In claim 25, the reference characters for steps c through e are followed by periods instead of parentheses.

In claim 30, the reference characters for steps a through f are followed by periods instead of parentheses.

In claim 31, the reference characters for steps a through e are followed by periods instead of parentheses.

Additionally, the ending punctuation of claim 26 “;.” Needs clarification.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-12, 14-26, and 30-31 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

In regards to claims 1-12, 14-26, and 30-31, the instant claims are drawn to a statistical algorithm. A statistical algorithm is non-statutory unless the claims include a

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step of physical transformation, or if the claims include a useful, tangible and concrete result. It is important to note, that the claims themselves must include a physical transformation step or a useful, tangible and concrete result in order for the claimed invention to be statutory. It is not sufficient that a physical transformation step or a useful, tangible, and concrete result be asserted in the specification for the claims to be statutory. In the instant claims, there is no step of physical transformation, thus the Examiner must determine if the instant claims include a useful, tangible, and concrete result.

In determining if the claimed subject matter produces a useful, concrete, and tangible result, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, and substantial. For a claim to be "concrete," the process must have a result that is reproducible. For a claim to be "tangible," the process must produce a real world result. Furthermore, the claim must be limited only to statutory embodiments.

Claims 1-12, 14-26, and 30-31 do not produce a tangible result. A tangible result requires that the claim must set forth a practical application to produce a real-world result. This rejection could be overcome by amendment of the claims to recite that a result of the method is outputted to a display or a memory or another computer on a network, or by including a physical transformation.

As stated in the section 2106 of the M.P.E.P., "The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing.

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However, the tangible requirement does require that the claim must recite more than a Sec. 101 judicial exception, in that the process claim must set forth a practical application of that Sec. 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a . . . process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract."

Claim Rejections - 35 USC § 102

The rejections of claims 1-4 and 6-13 under 35 U.S.C. 102(b) as being anticipated by Blas et al. [Industrial & Engineering Chemistry Research, 1998, volume 37, pages 660-674] are withdrawn due to amendments made by applicant to the set of claims filed on 20 December 2006.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 14-22, 34, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Gennings et al. [Journal of Agricultural, Biological, and Environmental Statistics, volume 3, pages 1-16, 1998].

Claims 1-5, 14-22, 34, and 36 state the following:

Claim 1 is a method of detecting an interaction among agents in a group or mixture by using fixed ratio ray design.

Claim 2 claims a plurality of full-ray groups.

Claim 3 limits claim 1 to a subset of agents.

Claim 4 limits claim 1 to graphical representation of the additivity and mixture models.

Claim 5 limits claim 1 to confidence bands based on the differences between the additivity and mixture curves.

Claim 14 uses a linear or nonlinear model to determine interaction thresholds in the threshold mixture model.

Claims 15 and 19 limit claim 14 to a specific additivity and threshold mixture model.

Claims 16 and 20 claim a plurality of full-ray groups.

Claims 17-18 and 21-22 limit claims 15 and 19 to removal of subsets of agents to analyze relative additivity.

Claims 34 and 36 plot the results of claims 1 and 14, respectively.

The study of Gennings et al., entitled, "Combination threshold models with design optimization along fixed-ratio rays," states in the abstract:

Threshold models are useful in concentration-effect studies to describe regions of exposure that result in background response. These models are parameterized to estimate the background response, the concentration-effect relationship, and the join-point between the two, called the threshold. If the threshold is different than zero, then it can be inferred that exposure to the chemical at regions below the threshold do not increase risk above background. When the

exposure is to many chemicals, fixed-ratio ray designs can be used to assess risk to single chemicals and to specified mixtures of chemicals. This article describes the inference resulting from use of a threshold model for correlated binary data supported by a ray design. An example of the effect of three hepatotoxins in the development of rats is provided. In addition, a two-stage simultaneous optimal design criterion is described for the threshold model along rays of fixed ratios. The approach is illustrated through a simulation study of the hepatotoxin data.

Consequently, Gennings et al. teaches usage of mixtures and analysis (using fixed ratio rays) of mixture data in rats (test subjects).

Gennings et al. teaches the use of an additivity model in section 2.2 on page 4, entitled, "Estimation of an additivity threshold surface." The first equation in section 2.2 of Gennings et al. teaches such an additivity model quantitatively. A threshold mixture model is taught through section 2 on page 3 of Gennings et al., entitled, "Threshold model for proportional data," and section 2.1 on pages 3-4 of Gennings et al., entitled, "Simultaneous estimation along each ray using a threshold model." Section 2.3.2 on pages 5-6 of Gennings et al., entitled, "Comparison of predicted thresholds along each mixture ray to the location of the threshold under additivity," compares the additive and mixture models by using thresholds.

In the example study in section 4 of Gennings et al. on pages 8-12 of Gennings et al., Table 4 of Gennings et al. on page 11 illustrates modeling the interaction of three agents (DEHP, HEPT, and TCE) by removing two of the three agents, and then examining the effects of a mixture on the mixture in Ray 4, which is a 70:1:29 mixture of DEHP, HEPT, and TCE, respectively. Table 3-5 on page 11-12 of Gennings et al. tabulate a plurality of full-ray groups. Figure 2 on page 10 of Gennings et al. is interpreted as a comparison between an additivity model and a mixture model.

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Confidence bands are described in the full paragraph on page 10 of Gennings et al., which states:

As evidenced by the data points in Figure 2 and the p values in Table 3, the proportion of prenatal loss across litters is large. The 95% confidence interval for the threshold for DEHP covers the entire experimental region ...[and] the threshold interval for total dose along the mixture ray.

A "threshold" mixture model is used in Gennings et al. because the threshold is used as a means as a "cut-off" for the departure from additivity of a mixture.

Claim Rejections - 35 USC § 103

The rejections of claims 30-31 under 35 U.S.C. 103(a) as being unpatentable over Blas et al [Industrial & Engineering Chemistry Research, 1998, volume 37, pages 660-674] in view of Combs et al. [Journal of Chemical Education, 1995, volume 72, pages 608-609] are withdrawn due to amendments made by applicant to the set of claims filed on 20 December 2006.

The rejections of claims 14-26 under 35 U.S.C. 103(a) as being unpatentable over Blas et al [Industrial & Engineering Chemistry Research, 1998, volume 37, pages 660-674] in view of Gennings et al. [Journal of Agricultural, Biological, and Environmental Statistics, volume 2, 1997, pages 198-211] are withdrawn due to amendments made by applicant to the set of claims filed on 20 December 2006.

The rejections of claims 1 and 5 under 35 U.S.C. 103(a) as being unpatentable over Blas et al [Industrial & Engineering Chemistry Research, 1998, volume 37, pages 660-674] in view of Gennings et al. [Journal of Agricultural, Biological, and Environmental Statistics, volume 2, 1997, pages 198-211] are withdrawn due to amendments made by applicant to the set of claims filed on 20 December 2006.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

35 U.S.C. 103 Rejection #1:

Claims 6-14, 23-26, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gennings et al.

Claim 6 is a method of detecting using a fixed ratio ray design, the interactions of agents in a group or mixture using a polynomial model.

Claim 7 limits claim 6 to a plurality of full-ray groups.

Claim 8 limits claim 6 to a subset of agents.

Claim 9 limits claim 6 to a linear model when using a single chemical data.

Claim 10 limits claim 9 to the generation of an additivity curve and a polynomial curve.

Claim 11 and 12 limit claim 6 to a generalized linear model and a general non-linear model, respectively.

Claim 13 limits claim 6 to generating a graphical representation of said polynomial in total dose.

Claim 23 limits claim 14 to a threshold mixture model using a polynomial model.

Claim 24 limits claim 23 to a plurality of full-ray groups or mixtures.

Claim 25 limits claim 23 to removal of subsets of agents in order to determine interactions between agents.

Claim 26 claim use of single chemical data.

Claim 35 plots the results of claim 6.

The study of Gennings et al., entitled, "Combination threshold models with design optimization along fixed-ratio rays," states in the abstract:

Threshold models are useful in concentration-effect studies to describe regions of exposure that result in background response. These models are parameterized to estimate the background response, the concentration-effect relationship, and the join-point between the two, called the threshold. If the threshold is different than zero, then it can be inferred that exposure to the chemical at regions below the threshold do not increase risk above background. When the exposure is to many chemicals, fixed-ratio ray designs can be used to assess risk to single chemicals and to specified mixtures of chemicals. This article describes the inference resulting from use of a threshold model for correlated binary data supported by a ray design. An example of the effect of three hepatotoxins in the development of rats is provided. In addition, a two-stage simultaneous optimal design criterion is described for the threshold model along rays of fixed ratios. The approach is illustrated through a simulation study of the hepatotoxin data.

Consequently, Gennings et al. teaches usage of mixtures and analysis (using fixed ratio rays) of mixture data in rats (test subjects).

Gennings et al. teaches the use of an additivity model in section 2.2 on page 4, entitled, "Estimation of an additivity threshold surface." The first equation in section 2.2 of Gennings et al. teaches such an additivity model quantitatively. A threshold mixture model is taught through section 2 on page 3 of Gennings et al., entitled, "Threshold model for proportional data," and section 2.1 on pages 3-4 of Gennings et al., entitled, "Simultaneous estimation along each ray using a threshold model." Section 2.3.2 on pages 5-6 of Gennings et al., entitled, "Comparison of predicted thresholds along each mixture ray to the location of the threshold under additivity," compares the additive and mixture models by using thresholds.

In the example study in section 4 of Gennings et al. on pages 8-12 of Gennings et al., Table 4 of Gennings et al. on page 11 illustrates modeling the interaction of three agents (DEHP, HEPT, and TCE) by removing two of the three agents, and then examining the effects of a mixture on the mixture in Ray 4, which is a 70:1:29 mixture of DEHP, HEPT, and TCE, respectively. Table 3-5 on page 11-12 of Gennings et al. tabulate a plurality of full-ray groups. Figure 2 on page 10 of Gennings et al. is interpreted as a comparison between an additivity model and a mixture model. Confidence bands are described in the full paragraph on page 10 of Gennings et al., which states:

As evidenced by the data points in Figure 2 and the p values in Table 3, the proportion of prenatal loss across litters is large. The 95% confidence interval for the threshold for DEHP covers the entire experimental region ...[and] the threshold interval for total dose along the mixture ray.

A "threshold" mixture model is used in Gennings et al. because the threshold is used as a means as a "cut-off" for the departure from additivity of a mixture.

Although Gennings et al. does not employ a polynomial additivity model directly in the reference, Gennings et al. does indicate that such a polynomial model can be utilized in the equation on page 1 of Gennings et al. Such a model is both generalized linear and generalized non-linear depending on the number of components in the mixture. For example the equation on page 1 of Gennings et al. is a linear model if single chemical data are examined. A schematic of the ray shown in the additivity model of page 1 of Gennings et al. is illustrated in Figure 1 on page 2 of Gennings et al.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the threshold mixture model of Gennings et al. by use of the polynomial additivity model of Gennings et al., because the polynomial additivity model not only has an art accepted equivalent function to the additivity model used in the threshold model, but it also has the advantage of modeling synergisms between components of a mixture.

35 U.S.C. 103 Rejection #2:

Claims 30-31 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gennings et al. as applied to claims 6-14, 23-26, and 35 above, in further view of Schork et al. [US PG PUB 2002/0077775].

Claims 30 and 31 enact the claims of claims 1 and 6, respectively, on software.

Claims 37 and 38 plot the result of claims 30 and 31 on a plot or table.

Gennings et al. as applied to claims 6-14, 23-26, and 35 above, fails to teach use of software in computerized automation of the process.

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However, the application of Schork et al., entitled, "Methods of DNA marker-based genetic analysis using estimated haplotype frequencies and uses thereof," is drawn to the statistical analysis of biological haplotypes [see abstract of Schork et al.]. Figure 2 of Schork et al. shows a computer system for automation of their statistical techniques.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the biostatistics model of Gennings in view of the statistical genetics model of Schork et al. because Schork et al. has the advantage of automating the statistical analysis of an analogous problem on computers containing software.

Response to Arguments

Applicant's arguments filed 20 December 2006 have been fully considered but they are not persuasive.

The arguments of the applicant concerning previous prior art rejections on pages 17-23 of the Remarks of 20 December 2006 have been considered. In light of the amendments to the set of claims, the previous prior art rejections are withdrawn and the current prior art rejections are enacted.

The arguments of the applicant concerning previous nonstatutory (35 U.S.C. 101) rejections have been considered.

In response to the nonstatutory rejection, applicants themselves go through the step-by-step determination for determining statutory subject matter as dictated by section 2106 of the M.P.E.P. and the Interim Guidelines of 22 November 2005.

Applicants argue on page 14 of the Remarks of 20 December 2006 that the algorithm presented is not a mathematical algorithm. This argument is persuasive, and the Office acknowledges that the algorithm presented is not a pure mathematical algorithm. It will be considered (and has been in the Office action) as a "statistical" algorithm.

However, applicant still must demonstrate the existence of a "useful, concrete, and tangible" result. Applicants claim the existence of a tangible, real-world result on page 17, when they state, "Thus, it [a statistical p value] indicates that the chemicals in the mixture influence the effect of one another so that the dose-responsiveness of a given chemical changes in the presence of one or more other chemicals."

However, this "p-value," no matter how statistically important the number is, does not meet the bar as a tangible result, because a number does not have practical application. Numbers, in and of themselves, are data and are not patentable.

This rejection could be overcome by incorporating the limitations of the five newly added claims into the appropriate independent claims. The plots and tables of claim 34-38 show a practical application of the data derived in the independent claims.

Conclusion

No claim is allowed.

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, Ph.D., whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Irem Yucel, Supervisory Patent Examiner, can be reached at (571) 272-0781.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSN

28 February 2007

Mr

28 February 2007

John S. Brusca 28 February 2007
JOHN S. BRUSCA, PH.D.
PRIMARY EXAMINER